Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1 (Canceled).

Claim 2 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 4 wherein depositing of said at least one monolayer comprises depositing a sufficient number of said monolayers to reduce the mean pore diameter of said pores to below about 20 Å.

Claim 3 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 4 wherein depositing of said at least one monolayer comprises depositing a sufficient number of said monolayers to reduce the mean pore diameter of said pores to no greater than 5 Å.

Claim 4 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane having a matrix of material particles of an inorganic compound selected from the group consisting of metal oxides, metal nitrides, and metal carbides, which make up the pore walls of the pores of said matrix comprising vapor treating said ceramic inorganic membrane with a reactive vapor of a precursor inorganic compound which includes a reactive group that reacts with hydroxyls on the surface of said pore walls of said matrix particles, and which reacts with water, so as to produce a reaction with said surface hydroxyls to thereby bond precursor molecules to the pore walls of said matrix particles, and thereafter treating the surface of said pore walls of said matrix particles with water vapor to convert the precursor inorganic compound into the corresponding inorganic compound and thereby producing a deposit of at least one monolayer of said precursor inorganic compound uniformly on the surface of said pore walls of said material particles.

Claim 5 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 4 wherein said inorganic compound is treated with a precursor inorganic compound selected from the group consisting of chloro-silanes, organo-silicon compounds, chloro-titaniums, organo-titanium compounds, organo-aluminum compounds, chloro-zirconia, and organo-zirconia compounds.

Claim 6 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 4 wherein the inorganic compound is made of

an inorganic compound selected from the group of alumina, titania, zirconia, silica and alumina/silica mixtures.

Claim 7 (Previously presented): A method for reducing the pore size of ceramic inorganic membrane as claimed in claim 4 further comprising drying the inorganic compound prior to treating the inorganic compound with said reactive vapor of said precursor inorganic compound.

Claim 8 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 7 wherein said drying comprises heating the inorganic compound and holding the inorganic compound at a temperature of 100° C to 200° C for one to two hours in an evacuated vessel.

Claim 9 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 8 wherein said treating of said inorganic compound with said reactive vapor of said precursor inorganic compound comprises introducing said reactive vapor into said evacuated vessel, evacuating the vessel to remove unreacted precursor inorganic compound products and then introducing said water vapor into the vessel.

Claim 10 (Currently amended): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 9 further comprising evacuating and refilling the vessel with said reactive vapor ~~a plurality of~~ at least three or more times.

Claim 11 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 9 wherein said inorganic compound is comprised of gamma-phase alumina and said vapor treating with a reactive vapor comprises treating the inorganic compound with a trimethyl aluminum vapor.

Claim 12 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 9 wherein said inorganic compound is comprised of gamma-phase alumina and said treating with a reactive vapor comprises treating the inorganic compound with an anhydrous aluminum chloride vapor.

Claim 13 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 9 wherein said inorganic compound is comprised of gamma-phase alumina and said treating with a reactive vapor comprises treating the inorganic compound with a titanium tetrachloride vapor.

Claim 14 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 4 wherein said at least one layer is deposited only on one side of said inorganic compound.

Claim 15 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane as claimed in claim 14 wherein, prior to depositing said at least one layer, said inorganic compound is seated in a holder which enables deposition on only said one side.

Claim 16 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane having a matrix of material particles of an inorganic compound selected from the group consisting of metal oxides, metal nitrides, and metal carbides, which make up the pore walls of the pores of said matrix to a mean pore diameter of below about 10 Å, said method comprising the following steps:

(a) drying the inorganic membrane to remove water from the pores thereof while leaving hydroxyls on the surface of said pore walls of said matrix particles;

(b) exposing the inorganic membrane to a reactive vapor of precursor inorganic compound having a reactive group to effect reaction thereof with said surface hydroxyls to bond precursor molecules to the pore walls of said matrix particles;

(c) exposing the inorganic membrane to water vapor to hydrolyze the precursor molecules and produce an inorganic compound deposit on the pore walls of said matrix particles; and

(d) repeating at least steps (b) and (c), as necessary, to reduce the mean pore diameter of said pores of said matrix of material particles to about 10 Å.

Claim 17 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane having a matrix of material particles of an inorganic compound as claimed in claim 16 wherein said drying comprises placing said inorganic membrane in a heated evacuated vessel to effect drying of said inorganic membrane, said reactive vapor being introduced into said vessel after drying of said inorganic membrane and said water vapor being introduced into said vessel after removal of unreacted products of said reaction.

Claim 18 (Previously presented): A method for reducing the pore size of an alumina membrane, said alumina membrane having a matrix of alumina particles which make up the pore walls of the pores of said matrix, comprising: treating the alumina membrane with trimethyl aluminum so that molecules of the trimethyl aluminum react with hydroxyls on the surface of said pore walls of said alumina matrix particles and are chemically bonded to said surface and methane is produced as a reaction product; and treating the alumina membrane with water vapor so that water molecules react with any

remaining methyl groups to liberate methane and to leave hydroxyl groups attached to deposited alumina.

Claim 19 (Original): A method for reducing the pore size of an alumina membrane as claimed in claim 18 wherein the alumina membrane is dried prior to treatment thereof with said trimethyl aluminum.

Claim 20 (Original): A method for reducing the pore size of an alumina membrane as claimed in claim 19 wherein said drying comprises heating the alumina membrane and holding the alumina membrane at a temperature of 100° C to 200° C for one to two hours in an evacuated vessel.

Claim 21 (Previously presented): A method for reducing the pore size of an alumina membrane as claimed in claim 20 wherein said trimethyl aluminum is introduced as a vapor into said vessel.

Claim 22 (Previously presented): A method for reducing the pore size of a ceramic inorganic membrane having a matrix of material particles of an inorganic compound selected from the group consisting of metal oxides, metal nitrides, and metal carbides, which make up the pore walls of the pores of said matrix to a mean radius at least as small as 5 Å, said method comprising the following steps:

(a) drying the ceramic membrane to remove water from the pores thereof while leaving hydroxyls on the surface of said pore walls of said matrix particles;

(b) exposing the membrane to a reactive vapor of precursor inorganic compound having a reactive group to effect reaction thereof with said surface hydroxyls to bond precursor molecules to the pore walls of said matrix particles;

(c) exposing the membrane to water vapor to hydrolyze the precursor molecules and produce an inorganic compound deposit on the pore walls of said matrix particles; and

(d) repeating at least steps (b) and (c), as necessary, to reduce the mean pore radius of said pores of said matrix of material particles to at least as small as 5 Å.

Claim 23 (Previously presented): A method for reducing the pore size of pores of a ceramic inorganic membrane as claimed in claim 22 wherein said drying comprises placing said membrane in a heated evacuated vessel to effect drying of the membrane, said reactive vapor being introduced into said vessel after drying of said membrane and

said water vapor being introduced into said vessel after removal of unreacted products of said reaction.

Claim 24 (Original): The method of claim 4 wherein said vapor treating is carried out in a temperature range of ambient to about 300° C.